

DON'T DRINK THE WATER

Water in 65 Texas Communities Contains Toxic Levels of Arsenic, but State Fails to Advise Citizens to Use Alternative Water Supplies



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THE ENVIRONMENTAL INTEGRITY PROJECT

The Environmental Integrity Project (<http://www.environmentalintegrity.org>) is a nonpartisan, nonprofit organization established in March of 2002 by former EPA enforcement attorneys to advocate for effective enforcement of environmental laws. EIP has three goals: 1) to provide objective analyses of how the failure to enforce or implement environmental laws increases pollution and affects public health; 2) to hold federal and state agencies, as well as individual corporations, accountable for failing to enforce or comply with environmental laws; and 3) to help local communities obtain the protection of environmental laws.

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Toxic Drinking Water in Texas

The federal Safe Drinking Water Act has required public water supplies to limit arsenic concentrations in drinking water to no more than 10 parts per billion (ppb) since 2006, in order to reduce exposure to the deadly toxin linked to lung and bladder cancers, neurological problems, and other illnesses. But the average arsenic concentrations in 65 Texas community water systems serving more than 82,000 people has exceeded that health-based standard over the last two years, according to data from the Texas Commission on Environmental Quality (TCEQ).¹ About 51,000 of these people in 34 communities have been exposed to contaminated drinking water for at least a decade, many at levels several times higher than the arsenic limit.

For example, in Jim Hogg County in South Texas, more than 5,000 people have been exposed to arsenic concentrations more than four times the limit in the Safe Drinking Water Act for at least five years, state records show. In the City of Seagraves, in West Texas, 2,396 residents have been exposed to water with arsenic more than triple the health standards for more than a decade. (See Table 1 for a list of the communities and their two-year and long-term average arsenic levels.)

Despite the health risks, Texas fails to tell consumers to stop drinking the water and instead implies that it is safe. When local water utilities find violations, federal law requires local water utilities to tell consumers that lifetime exposure to arsenic concentrations above 10 ppb may increase cancer risk. But Texas also requires the advisories to state: “This is not an emergency... You do not need to use an alternative water supply.”² (For the full text of the language Texas requires in drinking water notifications, see Appendix A).

The drinking water disaster in Flint, Michigan, reminds us how important it is for government to let the public know when to avoid drinking contaminated water. Federal law requires system operators to notify customers on a quarterly and annual basis when their drinking water violates standards for arsenic or other pollutants. But Texas is far from clear with its residents.

Whatever is intended, the Texas notices seem likely to lead some people to continue drinking contaminated water. Telling consumers they don’t need to replace water contaminated by arsenic suggests the water somehow remains safe to drink. While the law requires drinking water utilities to meet federal arsenic limits, it does not prohibit Texans or anyone else from drinking or cooking with water loaded with arsenic or other pollutants. But should the state suggest to its citizens that it is safe to do so?

The advice from other states and public health experts is more straightforward, at least for private well owners. These states, including Wisconsin, Michigan, Maine, and Washington, tell people not to drink water with more than 10 ppb arsenic. For example, Wisconsin advises private well owners: “If your arsenic level is more than 10 ppb, the Wisconsin Department of Health Services recommends that you stop using your water for drinking or food preparation.”³ Florida advises its consumers to avoid water where arsenic contamination persists.⁴ The U.S. Department of Health and Human Services makes

similar recommendations.⁵ If anything, the most recent science suggests that the 10 ppb arsenic standard is not protective enough and that the IQ of children can be damaged at much lower exposures (see page 7).

As this report explains, some of the affected water systems are being upgraded to remove arsenic, while others may need financial assistance to complete such actions. In the meantime, consumers should be cautioned to avoid water that keeps flunking Safe Drinking Water Act standards for this deadly carcinogen.

It seems unlikely that state regulators who advise the public about health risk would let their own families keep drinking water that violates the Safe Drinking Water Act limit for arsenic year after year. If that is the case, then Texas health advisories should stop implying that water that keeps failing those standards is somehow safe to drink. This report also recommends that:

- The U.S. Environmental Protection Agency (EPA) should revise its regulations to require that states advise people to stop drinking or cooking with water that fails to meet arsenic standards, at least when the contamination persists over several years. The advice should be sensitive to the additional risks posed when children and other sensitive populations drink contaminated water. If there is no reason for consumers to take precautions, there is no reason for Safe Drinking Water Act standards in the first place.
- Public notices should inform consumers of options for treating contaminated water at home, e.g., through filter systems that have proven to be effective. Conversely, the public should be told what doesn't work. For example, while Texas advisories warn that boiling water won't reduce nitrate concentrations, it includes no such warning for arsenic, which also cannot be boiled away.
- Federal and state governments should provide enough funding to these 65 Texas communities to allow them to pay for the installation of water filtration systems or take other steps to eliminate the contamination problem. Some work has begun to build water treatment systems, but more funds are needed.

Informing consumers is an important strategy to protect public health. But information that is confusing or misleading is toxic to public understanding and public trust, and undermines action to make drinking water safe.

Table I. A verage Arsenic Concentrations in 65 Texas Community Public Water Systems

Water System (In order of arsenic levels)	County	Pop. Served	2014- 2015 avg. (ppb)	Long- term avg. (ppb)	Sampling Start Date
<u>Bruni Rural Water Supply Corp.*</u>	Webb	648	79.6	85.3	2/25/2002
<u>Jim Hogg County Water Control & Improvement Dist. 2</u>	Jim Hogg	5,010	56.2	43.2	2/25/2002
<u>Klondike Independent School Dist.</u>	Dawson	231	39.6	27.8	2/4/2003
<u>Duval County CRD Benavides*</u>	Duval	1,362	39.0	36.2	7/9/2003
<u>City of Seagraves*</u>	Gaines	2,396	35.5	38.8	2/27/2002
<u>City of Andrews*</u>	Andrews	11,088	29.9	21.3	6/20/2002
<u>Country Villa Mobile Home Park</u>	Bee	50	27.9	28.7	12/15/2004
<u>Loop Water Supply Corp.*</u>	Gaines	300	27.6	31.1	2/3/2003
<u>Perry Water Supply Corp.</u>	McLennan	420	25.3	18.1	1/21/2003
<u>TDCJ W Pack Unit*</u>	Grimes	1,597	22.9	25.0	9/3/2003
<u>Prairie Hill Water Supply Corp.*</u>	Limestone	2,055	22.9	23.7	8/27/2003
<u>Tri-County Special Utility District*</u>	Falls	5,013	22.2	22.9	8/6/2003
<u>City of New Home*</u>	Lynn	334	21.1	24.2	2/5/2003
<u>Welch Water Supply Corp.*</u>	Dawson	354	20.4	20.8	2/4/2003
<u>Pecan Grove Mobile Home Park*</u>	Lubbock	108	18.4	21.1	3/18/2003
<u>Boudreaux Gardens</u>	Harris	123	18.3	12.6	2/8/2006
<u>Lasalle Landing Water System*</u>	Jackson	111	17.4	19.3	5/17/2004
<u>Grassland Water Supply Corp.*</u>	Lynn	55	16.8	17.6	1/22/2004
<u>Hidden Tree Ranch</u>	Lubbock	60	16.4	18.3	4/14/2004
<u>Spring Creek Pure Utilities*</u>	Polk	150	15.7	28.5	7/14/2004
<u>Victoria County Water Control & Improvement Dist. 2*</u>	Victoria	882	15.2	14.1	9/22/2003
<u>City of Kenedy</u>	Karnes	8,101	15.0	16.1	3/18/2002
<u>Axtell Water Supply Corp.*</u>	McLennan	1,780	14.3	15.6	6/24/2003
<u>Matagorda County Water Control & Improvement Dist. 2</u>	Matagorda	471	14.2	9.0	3/9/2006
<u>Cotton Bayou Park</u>	Chambers	114	14.1	22.9	10/26/2004
<u>Town North Estates*</u>	Lubbock	210	14.0	16.1	3/4/2004
<u>EOL Water Supply Corp.*</u>	McLennan	1,735	14.0	15.3	6/25/2003
<u>Cyndie Park 2 Water Supply Corp.</u>	Nueces	45	13.9	13.2	2/2/2005
<u>Valley Acres Mobile Home Park Water System*</u>	El Paso	54	13.8	22.6	8/5/2004
<u>Terrells Mobile Home Park*</u>	Lubbock	70	13.7	15.3	2/23/2004
<u>Duval County CRD Concepcion</u>	Duval	161	13.5	10.6	2/2/2004
<u>Green Acres Mobile Home Park</u>	El Paso	141	13.4	13.6	3/23/2004
<u>Wolfforth Place</u>	Lubbock	460	13.4	15.3	5/22/2003
<u>City of Wolfforth*</u>	Lubbock	3,600	13.0	15.8	1/14/2002
<u>City of Seminole*</u>	Gaines	6,210	12.8	12.8	12/8/2003
<u>Country View Mobile Home Park</u>	Lubbock	55	12.6	12.3	4/2/2013
<u>City of Riesel</u>	McLennan	1,009	12.5	13.1	6/2/2009

Water System (In order of arsenic levels)	County	Pop. Served	2014- 2015 avg. (ppb)	Long- term avg. (ppb)	Sampling Start Date
<u>Ellinger Sewer and Water Supply Corp.*</u>	Fayette	462	12.4	13.5	5/14/2003
<u>City of Plains*</u>	Yoakum	1,481	12.4	13.7	2/6/2003
<u>Sawmill Addition</u>	Orange	72	12.2	11.8	7/26/2004
<u>Freer WCID</u>	Duval	3,161	12.1	34.3	1/23/2002
<u>Lake Livingston Green Acres</u>	Polk	120	12.1	15.2	8/4/2004
<u>El Paso Tornillo Water Improvement Dist.*</u>	El Paso	3,400	11.9	12.2	10/16/2002
<u>Candelaria Water Supply Corp.*</u>	Presidio	84	11.9	12.5	11/16/2004
<u>City of Danbury</u>	Brazoria	2,325	11.8	9.4	11/6/2003
<u>Town North Village Water System*</u>	Lubbock	335	11.8	12.6	3/12/2003
<u>Birome Water Supply Corp.</u>	Hill	1,523	11.7	11.7	2/18/2003
<u>R M S Water Supply Corp.</u>	McLennan	(see note)	11.5	12.7	12/6/2007
<u>Valley Estates</u>	Lubbock	70	11.4	11.2	3/18/2004
<u>Gardendale Mobile Home Park</u>	Ector	50	11.3	11.2	11/11/2008
<u>City of Opdyke West*</u>	Hockley	273	11.3	12.4	2/5/2004
<u>Whorton Mobile Home Park*</u>	Lubbock	60	11.3	16.0	3/28/2005
<u>Refugio County Water Control & Improvement Dist. I</u>	Refugio	479	11.3	10.7	12/18/2003
<u>Village of Surfside Beach*</u>	Brazoria	3,477	11.1	11.9	6/30/2003
<u>Tempe Water Supply Corp. I</u>	Polk	2,112	11.1	13.6	8/20/2003
<u>M S Water Supply Corp.*</u>	McLennan	744	10.8	11.0	5/8/2003
<u>Twin Oaks Mobile Home Park*</u>	Midland	234	10.8	13.1	2/11/2004
<u>Redford Water Supply</u>	Presidio	156	10.8	10.7	8/2/2004
<u>City of Liverpool*</u>	Brazoria	619	10.7	11.5	10/16/2003
<u>Jim Wells County Fresh Water Supply Dist. I</u>	Jim Wells	1,902	10.7	10.2	9/9/2003
<u>Sherwood Estates Mfg. Townhome</u>	Midland	150	10.6	12.8	2/11/2004
<u>Cox Addition Water System*</u>	Lubbock	126	10.5	11.3	11/24/2003
<u>Iwanda Mobile Home Park</u>	Orange	38	10.5	10.4	6/21/2004
<u>City of Morton</u>	Cochran	2,025	10.4	11.0	6/3/2002
<u>Hackberry Creek Subdivision</u>	Chambers	165	10.1	33.9	7/19/2004

Notes: Systems marked with * have consistently exceeded 10 ppb for at least a decade (2005-2016), based on annual averages and available data. The communities are listed in order of their 2014-2015 arsenic concentrations. See the attached spreadsheet for annual averages and a sortable version of this table. "Long-term" averages refer to the average since the sampling start date. Some data gaps exist due to infrequent sampling. R M S Water Supply Corp. does not directly serve a community. Rather, it sells water to the City of Riesel and M S Water Supply Corp. Click on the name of system to visit Texas Drinking Water Watch. See Appendix A for a list of communities and their annual average arsenic concentrations.

Texas Communities with Tainted Water

The 65 Texas water systems with excessive levels of arsenic are mostly in small towns or rural areas clustered in West Texas and near the Gulf Coast. (See Map 1, below). Some of these systems serve mobile home parks that house low-income residents. Together, these 65 public systems with arsenic-tainted water serve more than 82,000 people.⁶ About 51,000 residents in 34 communities have been exposed to contaminated drinking water for at least a decade, many at levels several times higher than the arsenic limit. (Table 1). At least 30,000 of these residents were likely exposed to concentrations of arsenic at levels at least twice the federal standard in 2014 and 2015, according to state data.⁷ (Table 2).

Table 2. Summary of Texas Water Systems Supplying Water Containing Over 10 ppb Arsenic

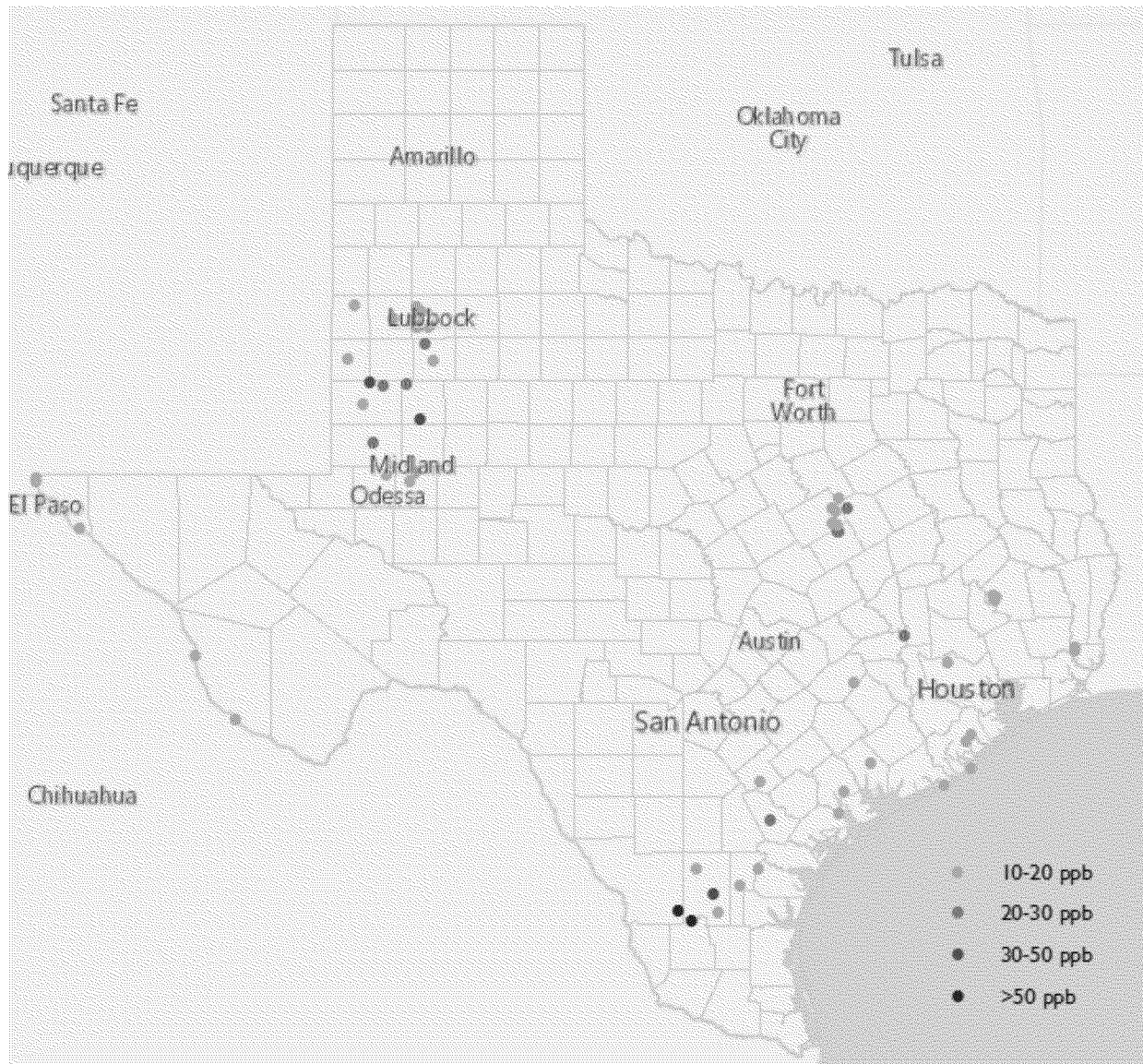
Average Concentration Range (2014-2015)	Number of Community Water Systems	Population Served
Greater than 50 ppb	2	5,658
30-50 ppb	3	3,989
20-30 ppb	9	21,211
10-20 ppb	51	51,348
Total	65	82,206

These communities rely on groundwater, and the arsenic in their water often comes from natural sources underground, according to TCEQ. Arsenic is a chemical element and carcinogen that exists in some rocks and dirt, and it has been used in a variety of industrial products, including pesticides, paint, and wood preservatives.⁸ It is also a well-known poison at high doses. According to EPA, arsenic can build up inside iron pipes and storage tanks and then be released in dangerous amounts when there is a change in flow rates or water chemistry.⁹ This can be hard to detect, however, because there are no federal requirements for monitoring water quality within distribution systems.¹⁰

The highest average arsenic levels in Texas were in Bruni, Texas, about 42 miles east of Laredo. There, the Bruni Rural Water Supply Corporation has supplied 648 people with water containing arsenic at levels nearly eight times the federal standard over the past two years, according to state data.¹¹

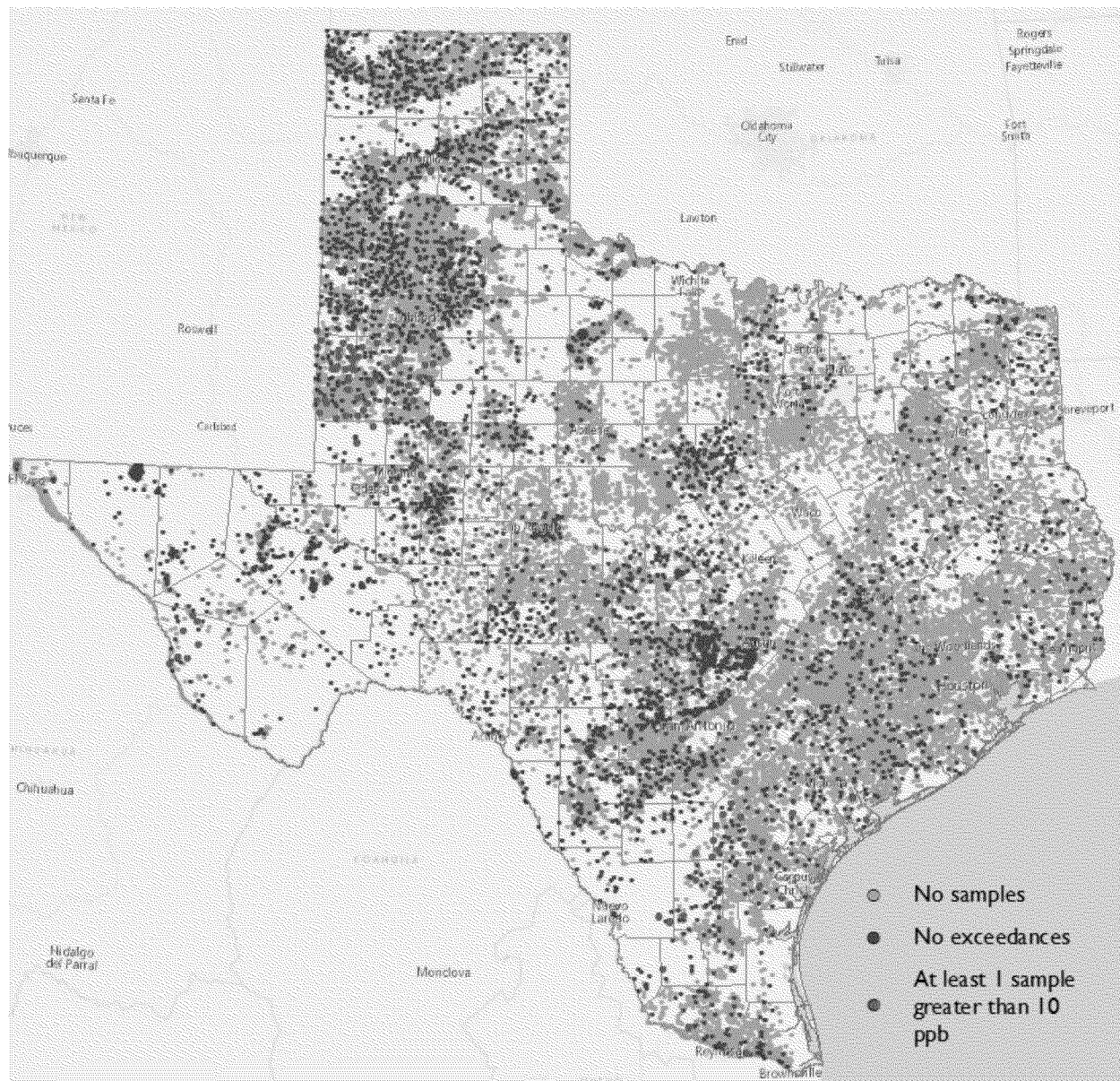
Because many smaller water systems test for arsenic less than once every three years, some consumers have no way of knowing when they might be drinking toxic water. Texas regulations require systems that use groundwater to sample for arsenic every three years. If results show levels in excess of the legal limit, they have to sample quarterly until levels are consistently below the federal standard of 10 ppb.¹² But not all systems comply with these requirements. For example, in West Texas, Deys RV and Mobile Park in Andrews County last tested for arsenic in 2013 and detected concentrations of 12.3 ppb. The system has not sampled for arsenic since, according to data available from the state, but appears to be active and supplying water to 296 people.

Map 1 . Average Arsenic Concentrations in Community Public Water Supplies , 2014 -2015



Residents who rely on private water wells in the same areas may also be exposed to arsenic in their drinking water. Figure 2 (below) shows domestic and irrigation groundwater wells that have detected dissolved arsenic concentrations over 10 ppb since 1985, according to sampling data from the Texas Water Development Board.¹³ Private wells, unlike public water systems, are not protected by the federal Safe Drinking Water Act.

Map 2 . Dissolved arsenic detected in private domestic and irrigation water supply wells at levels over 10 ppb ¹⁴



The Health Effects of Arsenic

Arsenic is known to cause cancers of the lung, kidney, bladder, skin, and other organs; and any level of exposure carries some risk.¹⁵ According to EPA, the risk of developing cancer after drinking water containing 10 ppb arsenic over a lifetime is 1 in 2,000.¹⁶ This level of risk is almost never 'acceptable' from a regulatory perspective. The agency usually tries to limit lifetime cancer risk to no more than 1 in 10,000, at most. EPA's risk estimate assumes that the cancer risk is linear, meaning if water contains 20 ppb arsenic, those who drink it over a long period of time have a 1 in 1,000 chance of developing cancer. People exposed

over shorter periods of time have lower risks, but exposure during childhood may have a greater impact than exposure during adulthood.¹⁷

And those risk calculations reflected the old thinking. New evidence suggests that the cancer risk may be much higher. EPA is currently revising its assessment of cancer risks from arsenic to incorporate more recent science. A 2010 draft of the assessment indicated that the risk of getting cancer from drinking water containing 10 ppb of arsenic is closer to 1 in 136, more than 17 times higher than current assumptions.¹⁸

In addition to causing cancer, arsenic is also a neurotoxin that can harm developing brains at levels at or below the allowable limit.¹⁹ One recent study in Maine, for example, found significant reductions in IQ and other problems in children exposed to arsenic concentrations of 5 to 10 ppb.²⁰ Specifically, children in homes with more than 5 ppb arsenic in the tap water tested roughly 6 points lower on a full-scale IQ test.²¹ What is clear is that the 'safe' level of arsenic is much lower than 10 ppb, and anything above 10 is clearly *unsafe*.

The history of the arsenic rule reflects the continuing evolution of scientific knowledge about the harms that even low levels of the element can cause. Back in 1996, Congress amended the Safe Drinking Water Act and directed EPA to establish new limits for arsenic to replace the old standard of 50 ppb.²² Based on the best available research, EPA proposed a limit of 5 ppb in 2000. The agency then revised its proposal, based in part on cost considerations, and finalized a new arsenic standard of 10 ppb in 2001. The EPA Administrator at the time, Christine Todd Whitman, explained that "the 10 ppb protects public health based on the best available science and ensures that the cost of the standard is achievable."²³ The new regulations required that public water systems across the U.S. meet the new standard by January 23, 2006.²⁴ The law allowed states to grant exemptions until January 23, 2015, for some small community water systems that had trouble complying.²⁵

Public Notices Fail to Protect Public Health

More than a decade after EPA and Texas were supposed to start enforcing the new arsenic standard, and despite the health problems that arsenic can cause, public awareness of the risks associated with arsenic remains murky. Public water systems are required to comply with public notice and reporting requirements established by the Safe Drinking Water Act and Texas regulations. These requirements exist to ensure that consumers know what is in their water and if they should take precautions. Unfortunately, the citizens of Texas routinely receive mixed messages in these notices, if they receive them at all.

Each year, community water systems are required to publish and distribute to customers a Consumer Confidence Report that summarizes water sampling results from the previous year, highlights any violations, and lists what is being done to correct the problem. The Safe Drinking Water Act also requires community water supplies to issue public notices when water quality tests reveal that water has arsenic over 10 ppb.

Sometimes community water suppliers fail to inform consumers that their water is contaminated. For example, some residents of a mobile home community on the Gulf Coast, Cyndie Park II in Nueces County, Texas, were unaware of the arsenic in their water for several years, until they found out in 2011.²⁶ Water from this community system exceeded 10 ppb arsenic for at least 6 years before this date, according to sampling results from the TCEQ. Other systems, like those serving Lubbock County's Whorton Mobile Home Park, Hidden Tree Ranch, and Pecan Grove Mobile Home Park; the City of Andrews, in west Texas; and the community of Bruni, east of Laredo, have been issued violations related to public notice and reporting over the past two years, according to TCEQ's online records.²⁷

In addition to annual reports that document drinking water quality, water systems are required to issue and post public notices when water has arsenic over 10 ppb, generally on a quarterly basis. Both EPA and TCEQ require local utilities or communities to include the following statement about the risks posed by arsenic: "Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer."²⁸ This statement fails to advise consumers about risks to sensitive populations, such as children, who are more susceptible to the impacts of arsenic exposure. For the sake of contrast, here is how the state of Michigan explains the risks associated with arsenic:

*The way arsenic affects our bodies is not fully understood. Long-term exposure to low levels of inorganic arsenic in drinking water is known to cause human health problems including: cancer, thickening and discoloration of the skin, problems with blood vessels, high blood pressure, heart disease, nerve effects including numbness and/or pain, and interference with some important cell functions. Short-term exposure to very high levels of arsenic may cause stomach pain, nausea, vomiting, diarrhea, headaches, weakness, and even death; but, groundwater in Michigan has not been shown to have this high a level of arsenic. There is some evidence that suggests that long-term exposure to low levels (≥ 0.005 milligrams/liter (mg/L)) of arsenic from drinking water may result in lower IQ scores in children.*²⁹

Is Water Contaminated with Arsenic Safe to Drink?

Regardless of how specific risks are explained, consumers most want to know whether it is safe to keep using water that is contaminated with arsenic. The EPA allows states to decide whether or not to advise residents to find alternative sources of drinking water when the local water supply violates the limit in the Safe Drinking Water Act. In contrast to other states, Texas requires public notices from water systems to include the phrases "this is not an emergency," and "you do not need to use an alternative water supply."³⁰ Perhaps that language makes sense when an arsenic violation is rare and does not recur. But it should be unacceptable for systems that have violated the health-based standard for arsenic for a long period of time. After years of drinking water that contains over 10 ppb of arsenic, consumers should be advised to use another water supply due to the long-term risks of exposure to the toxin, especially when children may be exposed.

Other states and public health experts are more straightforward with their advice about drinking water containing over 10 ppb of arsenic, at least for private well owners. Private well water is not regulated under the Safe Drinking Water Act,³¹ unlike water in public drinking water systems. Regardless of the source of drinking water—a private well or a public supply—the health risks associated with arsenic are the same. Table 3 highlights some of the language used by other states and the U.S. Department of Health and Human Services.

Table 3. Advice to Private Well Owners About Arsenic in Drinking Water

Agency	Advice to private well owners
U.S. Department of Health and Human Services (ATSDR)	“Residents should install a treatment system that effectively removes arsenic, find an alternative source of drinking water, or use bottled water for drinking and cooking if their home drinking water comes from wells in which the arsenic level exceeds 10 µg/L (ppb).” ³²
Michigan Department of Environmental Quality	“If the arsenic in your water exceeds 0.010 mg/L (10 ppb), the DEQ recommends that you do not use your well water for drinking or cooking.” ³³
Florida Department of Health	“Levels of arsenic less than the drinking water standard are not likely to cause illness. Drinking water with levels slightly above the standard for a short time period does not significantly increase the risk of illness. However, because health risks increase as the levels of a chemical (or how long a person drinks it) increases, it is best to drink water that meets standards.” ³⁴
Wisconsin Department of Natural Resources & Department of Health Services	“If your arsenic level is more than 10 ppb, the Wisconsin Department of Health Services recommends that you stop using your water for drinking or food preparation.” ³⁵
Washington State Department of Health	“We recommend that water used for drinking or food preparation contain no more than 10 ppb arsenic. While reducing arsenic below 10 ppb can lower your chance of developing health effects, it is not low enough to completely eliminate that risk. If your water contains between 10 ppb and 50 ppb arsenic, your chance of developing health problems increases. We recommend you not drink water containing these levels or use it for food preparation over the long term. In either case, you will need to balance the health risks, costs, and convenience when deciding whether or not to continue to use your water supply. If your water contains more than 50 ppb arsenic, we recommend you stop using it immediately for drinking and food preparation.” ³⁶
Maine Department of Health and Human Services	<p>“If your result is between 10 and 50 µg/L (ppb) or 0.01 and 0.05 mg/L</p> <ul style="list-style-type: none"> • Don't drink your water or use it to make drinks like coffee, tea, juice, or infant formula. • You can use your water to cook and other uses. <p>If your result is above 50 µg/L (ppb) or 0.05 mg/L</p>

Agency	Advice to private well owners
	<ul style="list-style-type: none"> • Don't drink your water or use it to make drinks like coffee, tea, juice, or infant formula. • Don't use your water to make soups and stews, or to cook dried foods such as rice, beans, oatmeal and pasta. These foods absorb a lot of water during cooking. • You can use your water for other uses such as brushing teeth, bathing, washing dishes, and watering the garden... <p>In most cases, you can protect yourself if you stop drinking water with too much arsenic in it.”³⁷</p>
Minnesota Department of Health	<p>“Based on the MCL for public water systems, the Minnesota Department of Health (MDH) recommends that [private well] water containing more than 10 micrograms per liter of arsenic (10 ppb) not be consumed over the long term.”³⁸</p>

Removing Arsenic from Drinking Water

In Texas, plans to modify public water system treatment systems must be approved by the TCEQ. Sometimes the first option for small water systems is to dilute contaminated water by blending it with uncontaminated water, assuming a cleaner water supply is available. Water systems can also build treatment systems to remove arsenic. These systems can employ a range of technologies including filtration and precipitation, adsorption media like ferric oxide and activated alumina, ion exchange, and reverse osmosis.³⁹ Some methods to remove arsenic can also effectively remove other contaminants, like iron and dissolved solids. Treatment is not guaranteed to reduce arsenic to levels below 10 ppb, and costs must be considered, especially for small community water systems with limited financial resources.

In-home water treatment is another alternative, and these systems are often recommended for people who rely on private groundwater wells. Public water supplies can also provide these treatment systems to individual homes instead of, or in addition to, system-wide treatment. Some in-home treatment options include iron oxide filter systems, reverse osmosis, and anion exchange.⁴⁰ Each of these can be scaled to treat all water entering a home or at specific points within a home. However, people relying solely on in-home treatment systems should get their tap water tested to ensure that the systems are reducing arsenic and other contaminants to safe levels. Residents should also be careful to use only the treated water for drinking and cooking. Boiling water will not remove arsenic.

Many small community water systems have taken or are currently taking steps to clean up their water and protect consumers. Some have gone as far as closing down and evicting long-time tenants of properties with contaminated water, as the Greenwood Mobile Home Park in Midland County did in 2014.⁴¹ The City of Andrews, near Odessa in West Texas, received a \$380,000 grant from EPA in 2012 to build a new water filtration plant, and city officials said the project was finally completed in December 2015.⁴² The City of Smyer in West Texas provides treated water to citizens from a tap at City Hall, according to its website.⁴³ Some towns, like the City of Opdyke West, also in West Texas, and Birome,

south of Dallas, have received funding to construct treatment systems from the Texas Water Development Board, which offers money for improving water supplies.

Building filtration or alternative water supply systems can be difficult because government funding is often scarce and hard to secure in Texas and elsewhere. Many of these communities in Texas with contaminated water are in remote locations, and connecting to cleaner water supplies maintained by larger cities or counties can be expensive.

Conclusion and Recommendations

The water contamination crisis in Flint, Michigan, threw a national spotlight on problems with drinking water systems that extend far beyond one state and that are more profound than just pipes. A central failure in Flint was that the state government had information about contamination of drinking water, but did not warn the public. In Texas, the pollutant of greatest concern in the 65 communities discussed in this report is different – arsenic, instead of lead -- and the source of the problem is different. In Texas, the arsenic is naturally occurring; while in Michigan, the catastrophe was man-made, with the state and city trying to save money by switching to a source of water, the Flint River, that corroded the plumbing, releasing high levels of lead from pipes and solder.

But in both Michigan and Texas, the state governments compounded the water contamination problems – and allowed people’s exposure to damaging toxins to continue -- by not communicating clearly with consumers.

Deciding how best to explain health risks to the public is admittedly a challenging task. But there is enough evidence to reach the following conclusions:

- 1) Texas should update the language in its public notices so consumers clearly know when to safeguard their health by avoiding contaminated drinking water. Citizens should be told to find alternative drinking water sources, especially when children may be exposed and when arsenic contamination has persisted for a long period of time.
- 2) EPA is currently conducting a new review of arsenic toxicity, and it should conclude that work and revise its mandatory language for public notice of arsenic violations. This mandatory language should include a statement about the potential health risks of childhood exposure.
- 3) Public notices should inform consumers of options for treating contaminated water at home, e.g., through filter systems that have proven to be effective. Conversely, the public should be told what doesn’t work. For example, while Texas advisories warn that boiling water won’t reduce nitrate concentrations, it includes no such warning for arsenic, which also cannot be boiled away.

- 4) Both EPA and Texas should provide more financial and technical assistance to local governments and utilities to help them fix long-standing drinking water violations in rural and disadvantaged communities.

The short-term costs of building municipal water treatment systems can be significant, but they are dwarfed by the long-term costs of higher cancer risks and brain damage. More broadly, our whole system pays a high price when silence or double-talk corrodes the basic faith of citizens in their government.

Methods

The Environmental Integrity Project analyzed drinking water sampling data from the Texas Commission on Environmental Quality's (TCEQ) Drinking Water Watch Database. Our analysis is limited to community public water supply systems that, over the past two years, have supplied consumers with water with a two-year average arsenic concentration exceeding 10 ppb.

Some of these systems sampled at more than one entry point. Due to a lack of information about volumes entering distribution systems from each entry point, and information about which entry points serve particular neighborhoods, the amount of arsenic in drinking water received at any particular home faucet may be uncertain, especially if one entry point sample did not exceed 10 ppb while samples from other entry points did. Sampling results from entry points do not capture arsenic added or removed from a distribution system due to scaling in iron pipes or water tanks.

We calculated the average arsenic concentration from 2014 and 2015, the long-term average concentration based on the available data, and the annual average concentrations for each system. This analysis does not identify all community public water systems that are currently violating the drinking water standard for arsenic; rather, it identifies systems that have supplied arsenic-contaminated drinking water to communities over longer periods of time.

APPENDIX A: Texas' Mandatory Language for Public Notices about Arsenic Violations

The following is the language that Texas requires local water utilities to send to customers when their drinking water violates standards for arsenic in the Safe Drinking Water Act.⁴⁴

Notice of Drinking Water Arsenic Violation

Mandatory Public Notification Language

The Texas Commission on Environmental Quality (TCEQ) has notified the **(2) PUBLIC WATER SYSTEM NAME** water system that the drinking water being supplied to customers had exceeded the Maximum Contaminant Level (MCL) for **ARSENIC**. The U.S. Environmental Protection Agency (U.S. EPA) has established the MCL for **ARSENIC** at 0.010 mg/L, and has determined that it is a health concern at levels above the MCL. Analysis of drinking water in your community for **ARSENIC** indicates a level of **(3) ANALYSIS RESULT** mg/L. This violation occurred **(4) TIME PERIOD OF VIOLATION**

This is not an emergency. However, some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer. You do not need to use an alternative water supply. However, if you have health concerns, you may want to talk to your doctor to get more information about how this may affect you.

Steps to Correct the Problem:

(5) _____

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

Contact Information:

(6) PWS WATER REPRESENTATIVE NAME AND PHONE NUMBER

Notes

¹ Texas Commission on Environmental Quality, Texas Drinking Water Watch Database, available at: <http://dww2.tceq.texas.gov/DWW/>, accessed February 2016.

² Texas Commission on Environmental Quality Notice of Drinking Water Arsenid Violation. Available at <https://www.tceq.texas.gov/assets/public/permitting/watersupply/pdw/notices/chemical/arsenic.pdf>

³ Wisconsin Department of Natural Resources, Arsenic, Available at: <http://dnr.wi.gov/topic/groundwater/arsenic/>, accessed 3/7/2016.

⁴ Florida Department of health, Brueau of Environmental Health, "Chemicals in Private Drinking Water Wells Fact Sheet- Arsenic," Available at: <http://www.floridahealth.gov/environmental-health/drinking-water/documents/arsenic-fs.pdf>. Accessed 3/7/2016.

⁵ See e.g. U.S. Department of Health and Human Services, (2004), "Health Consultation: Arsenic in Private Drinking Water Wells, Cornville, Yavapai County, Arizona," available at: <http://www.atsdr.cdc.gov/HAC/pha/ArsenicInPrivate061504-AZ/ArsenicInPrivateHC061504.pdf>, accessed 3/8/2016. And Washington State Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (2014) "Health Consultation: Evaluation of Private Drinking Water Wells and Surface Water, Oso, Snohomish County, Washington State" available at: <http://www.doh.wa.gov/Portals/1/Documents/Pubs/334-357.pdf>, accessed 3/8/2016.

⁶ A community water system is one that serves 15 locations or 25 residents year-round. Cities, towns, apartment complexes, and mobile home parks fit into this category. See U.S. EPA (2001) Drinking Water Standard for Arsenic, fact sheet, available at <http://nepis.epa.gov/Exe/ZyPdf.cgi?Dockey=20001XXC.txt>, accessed 2/18/2016.

⁷ Texas Commission on Environmental Quality, Texas Drinking Water Watch Database, available at: <http://dww2.tceq.texas.gov/DWW/>, accessed February 2016.

⁸ U.S. Centers for Disease Control, fact sheet on arsenic. Available at http://www.cdc.gov/biomonitoring/pdf/Arsenic_FactSheet.pdf

⁹ U.S. EPA (2007) "Arsenic and Your Distribution System." EPA 816-F-07-005 Available at https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjpW9rRoYTLAhUGeSYKHVpcAjcQFggcMAA&url=http%3A%2F%2Fwww.epa.gov%2Fsites%2Fproducti%2Ffiles%2F2015-09%2Fdocuments%2Ffs_arsenic_dist_sys_factsheet_final.pdf&usg=AFQjCNEwHrGk63vA7oQ9vCYc3uPCK2vu4A&sig2=5PVFWijTZhxH-pQF9ReIQ&bvm=bv.114733917,d.eWE, accessed 2/18/2016.

¹⁰ Ibid.

¹¹ See n. 1

¹² 30 TAC §290.106, Inorganic Contaminants

[http://texreg.sos.state.tx.us/public/readtac\\$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&p_pg=1&p_tac=&ti=30&pt=1&ch=290&rl=106](http://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&p_pg=1&p_tac=&ti=30&pt=1&ch=290&rl=106)

¹³ University of Texas at Austin (2005) "Evaluation of Arsenic Contamination in Texas," Prepared for the Texas Commission on Environmental Quality, August 2005. Available at: <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwju5POz6PLKAhWEoD4KHUbmAY8QFggcMAA&url=http%3A%2F%2Fwww.beg.utexas.edu%2Ftceq%2Fdocs%2FGroundwater%2520Arsenic%2520Contamination%2520in%2520Texas%2520Report%25202005.pdf&usg=AFQjCNGUXq5ID2NcTWaZZIEWXjjRhzkodQ&sig2=-0E7G4fTaWNx8NZL3CWxLQ&bvm=bv.114195076,d.cWw>, accessed 2/12/2016.

¹⁴ See n. 1

¹⁵ U.S. EPA (1998), Integrated Risk Information System, Inorganic Arsenic, available at <http://www.epa.gov/iris/subst/0278.htm>.

¹⁶ The EPA describes arsenic's cancer-causing potency with a 'slope factor' (because it describes the slope of the dose-response curve). The current EPA slope factor for arsenic is 1.5 per mg/kg-d. This number represents the risk that can be expected from consuming one milligram of arsenic per kilogram of body weight per day. The EPA also translates the slope factor into a 'drinking water unit risk' of 5×10^{-5} per µg/L. For carcinogens, the formal MCL Goal is always zero. Zero is an unattainable goal, so in most cases the EPA will

reduce exposure to carcinogens to a level of 'acceptable risk,' something between 10^{-6} (1 in 1,000,000) to 10^{-4} (1 in 10,000).¹⁶ One way of looking at this range is to assume that risks less than 1 in 1,000,000 are always 'acceptable,' while risks greater than 1 in 10,000 never are. The risks of drinking arsenic at the MCL of 10 µg /L are much higher than 1 in 10,000.

¹⁷ See, e.g., National Research Council, Critical Aspects of EPA's IRIS Assessment of Inorganic Arsenic – Interim Report, 82 – 83 (2013). For health endpoints like childhood IQ, the critical window of exposure is obviously much less, encompassing in utero development and childhood.

¹⁸ See n. 2

¹⁹ ATSDR (2007), Toxicological Profile for Arsenic; Grandjean and Landrigan (2014), Neurobehavioural Effects of Developmental Toxicity, *Lancet Neurol* 13:330-338.

²⁰ Wasserman et al. (2014), A Cross-Sectional Study of Well Water Arsenic and Child IQ in Maine Schoolchildren, *Environ Health* 13:23-32.

²¹ Ibid. at 6.

²² EPA web page, "Drinking Water Arsenic Rule History," available at: <https://www.epa.gov/dwreginfo/drinking-water-arsenic-rule-history>.

²³ Ibid.

²⁴ Ibid.

²⁵ 40 CFR 142.20(a)(2)

²⁶ Savage, Jessica (Jan. 15, 2011) "Arsenic levels in rural community exceed federal limits: some who have lived there for years are unaware of the high toxin levels." *Corpus Christi Caller Times*. Available at: <http://www.caller.com/news/arsenic-levels-in-rural-community-exceed-federal-limits-ep-359610865-316341631.html>, accessed 2/18/2016.

²⁷ TCEQ Drinking Water Watch Database, available at <http://dww2.tceq.texas.gov/DWW/>, accessed 2/17/2016.

²⁸ 40 CFR Part 141 Subpart Q, Appendix B.

²⁹ Ibid.

³⁰ TCEQ "Notice of Drinking Water Arsenic Violation Mandatory Public Notification Language" available at: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwiT64_MqoLLAhXKGh4KHTktARYQFggcMAA&url=https%3A%2F%2Fwww.tceq.texas.gov%2Fassets%2Fpublic%2Fpermitting%2Fwatersupply%2Fpdw%2Fnotices%2Fchemical%2Farsenic.pdf&usg=AFOjCNEOcn47Zq4ANx8cqhyxCSKINoT2JA&sig2=1F8nrqHgcqksFWCMAVAqKg, accessed 2/18/2016.

³¹ U.S. EPA (2012) "2012 Edition of the Drinking Water Standards and Health Advisories," EPA 822-S-12-001. Available at: <http://1.usa.gov/1OuF1wY>

³² U.S. Department of Health and Human Services, (2004), "Health Consultation: Arsenic in Private Drinking Water Wells, Cornville, Yavapai County, Arizona," available at: <http://www.atsdr.cdc.gov/HAC/pha/ArsenicInPrivate061504-AZ/ArsenicInPrivateHC061504.pdf>, accessed 3/8/2016. And Washington State Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (2014) "Health Consultation: Evaluation of Private Drinking Water Wells and Surface Water, Oso, Snohomish County, Washington State" available at: <http://www.doh.wa.gov/Portals/1/Documents/Pubs/334-357.pdf>, accessed 3/8/2016.

³³ Michigan Department of Environmental Quality, Arsenic in Well Water, https://www.michigan.gov/documents/deq/deq-wd-gws-wcu-arsenicwellwater_270592_7.pdf.

³⁴ Florida Department of health, Bureau of Environmental Health, "Chemicals in Private Drinking Water Wells Fact Sheet- Arsenic," Available at: <http://www.floridahealth.gov/environmental-health/drinking-water/documents/arsenic-fs.pdf>. Accessed 3/7/2016.

³⁵ Wisconsin Department of Natural Resources, Arsenic, Available at: <http://dnr.wi.gov/topic/groundwater/arsenic/>, accessed 3/7/2016.

³⁶ Washington State Department of Health (2014) "Arsenic and Your Private Well," available at: <http://www.doh.wa.gov/Portals/1/Documents/Pubs/334-156.pdf>, accessed 3/7/2016.

³⁷ Maine Department of Health and Human Services, Division of Environmental Health, "Arsenic in Your Well Water," available at: <http://www.maine.gov/dhhs/mecdc/environmental-health/eohp/wells/documents/arsenicresultstipsheet.pdf>, accessed 3/7/2016.

³⁸ Minnesota Department of Health, "Arsenic in Minnesota's Well Water," available at: <http://www.health.state.mn.us/divs/eh/wells/waterquality/arsenic.html>, accessed 3/7/2016.

³⁹ TCEQ (2006) "Arsenic Rules & Removal Strategies" Presented by James "Red" Weddell, P.E. Technical Review and Oversight Team, Public Drinking Water Section. Available at: <http://www.tceq.state.tx.us/assets/public/permitting/watersupply/pdw/training/pdwconference2006/43.pdf>, accessed 2/18/2016.

⁴⁰ Oregon Health Authority, "Drinking Water Program Fact Sheet: Recommendations for Arsenic Removal from Private Drinking Water Wells in Oregon." Available at: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjwzZuJnITLAhUCcz4KHbtsBMgQFggdMAA&url=https%3A%2F%2Fpublic.health.oregon.gov%2FHealth%2FEnvironments%2FDrinkingWater%2FSourceWater%2FDocuments%2Fgw%2FArsenicremoval.pdf&usg=AFQjCNEUPqAzGWAe0nb7lVHwK7noZWEzRg&sig2=6T1P8P_pRhZSfhq-OxhsLw, accessed 2/18/2016.

⁴¹ Martinez, Geena. May 22, 2014. "Greenwood Mobile Home Residents Forced to Move Due to Water Issues." News West 9. Available at: <http://www.newswest9.com/story/25593809/greenwood-mobile-home-residents-forced-to-move-due-to-water-issues> accessed 2/18/2016.

⁴² EPA Press Release, "EPA Awards City of Andrews, Texas, Over \$380,000 to Improve Drinking Water Treatment System," February 10, 2012. Personal communication on March 3, 2016, with City of Andrews water department. Press release available at: <http://yosemite.epa.gov/opa/admpress.nsf/0/435E40628BCEC7A4852579A0005C6209>

⁴³ City of Smyer, Public notice about arsenic violation July 1 2015, available at: <http://www.smyvertx.com/page04.html>, accessed 3/8/2016

⁴⁴ See n. 3



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